



First solar-powered hydrogen plant in AF complete on Hickam

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5/20/2009 - **HICKAM AIR FORCE BASE, Hawaii** -- A \$1.1 million solar array project to power the base hydrogen production and fueling station was completed May 8 on Hickam AFB, marking a "first" for both the Air Force and the state of Hawaii.

After about six weeks of installation, 810 solar modules can now produce 146 kilowatts of energy per hour - equivalent to what it would take to power about 30 standard homes - which is enough to handle the maximum power demand of the hydrogen plant.

"In fiscal year 2008, the average cost of power on base was 21 cents per kilowatt hour," said Josh Powell, Vice President of Construction Operations at Sunetric.

At that cost, these solar panels will save an average of \$43,000 per year, he said.

"In this energy-conscious environment, every little bit helps," Powell said.

Now that the solar panels are installed, they will go through a week-long commissioning process, said Tom Quinn, Hawaii Center for Advanced Transportation Technologies (HCATT) director.

"We need to test the inverter box (which turns DC power into AC power) to make sure everything is working properly, then slowly ramp it from 25 percent working power to 50 percent power and higher," Quinn said. "It's a typical safety check we go through before we crank it up to full power."

By May 22, the commissioning process should be finished, and the plant will be running on renewable energy, he said.

The \$1.5 million hydrogen station was completed in November 2006; however, the fact that the hydrogen plant is now solar-powered means hydrogen is now a renewable fuel, Quinn said. This combination of solar panels with the hydrogen plant is what makes the project a dynamic, first-in-the-Air Force and first-in-Hawaii combination.

"The three principal players in this partnership are the Air Force Advanced Power Technology Office at Robins Air Force Base, Ga.; the HCATT; and the 15th Airlift Wing," said Quinn.

The office at Robins AFB provides the funding and guidance for the program, and the 15th Airlift Wing operates and evaluates the equipment, he said.

"The Advanced Power Technology Office recognized that there is a wealth of military installations here as well as a need," Quinn said, "which provide the potential for joint service projects."

The way it works is simple, said Nolie Diakoulas, Sunetric project engineer. When the sun hits the photovoltaic panels, electrons move from front to back, creating a current that travels through small wires to a junction box in the back. The junction box takes the current from the small wires and moves it to larger wires, which travel to a combiner box and then to an inverter. There, DC power is converted to AC (usable) power, which runs the base hydrogen station.

"Solar panels have been around since the space program of the '50s," Powell said. "This is a long-lasting, well established material with a warranty for 25 years. We can expect this to produce at 80 percent effectiveness for at least the first 20 to 30 years of its life and continue essentially forever."



HICKAM AIR FORCE BASE, Hawaii – A \$1.1 million solar array project to power the base hydrogen production and fueling station marks a "first" for both the Air Force and the state of Hawaii. Installation of the 810 solar modules was completed May 8 on Hickam Air Force Base. Now that the solar panels are installed, they will go through a week-long commissioning process. By May 22, the testing process should be finished, and the plant will be up and running. (U.S. Air Force photo by Senior Airman Carolyn Viss)

This system was designed for the specific environment here, he said.

The solar panels are wind-rated and hurricane proof, Diakoulas said. They're seismic-level four rated, hurricane proof, and designed not to blow away in the Hawaii trade winds.

The state of Hawaii formed a partnership with the Air Force and established the National Demonstration Center for Alternative Fuel Vehicles in 2001, Quinn said. The goal of the program was to develop non-petroleum-based power for vehicles. Early projects included both hybrid and all-electric vehicles, to include the electric shuttle bus operating at the passenger terminal. More recently, a lithium battery-powered step van was developed and demonstrated and will soon go commercial. The first hydrogen-powered vehicle here was developed in 2003, and because the hydrogen plant is now powered by the solar array they have achieved a major demonstration milestone in the program.

"We have a total of seven hydrogen powered vehicles, all different types, here, but this truck is unique as it is a new concept vehicle," Quinn said. "Once we've tested and demonstrated its capabilities, we hope it will join the Air Force inventory."